



PRELIMINARY GEOLOGICAL REPORT NORTH DARLING POOL

Township 37 North, Ranges 4-5 West
Toole and Glacier Counties
Montana

By
HAMILTON L. TINGLEY

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By

Hamilton L. Tingley*

INTRODUCTION

The purpose of this report is to give a brief history and a cursory geological and engineering examination of the North Darling Pool Area, with special references to the known producing area that straddles the United States-Canadian Boundary.

The writer has been in charge of 11 wells drilled in this area and out of professional curiosity has been present during the drilling in of 15 additional wells, including two on the Canadian side.

Operators in the area in question who are producing two or more wells are as follows:

Albermont Petroleums, Ltd., Calgary, Alberta
Ponder Oils, Ltd., Calgary, Alberta
Crusade Holdings, Ltd., Calgary, Alberta
Ralph E. Fair, Inc., San Antonio, Texas
Union Oil of California, Cut Bank, Montana
American Oil Co. (Pattie, Stewart & Albermont), Cut Bank, Montana
L. W. Winkler & Son, Denver, Colorado

LOCATION

The area in question is located approximately 15 miles west of the joint towns of Coutts,

Alberta, and Sweetgrass, Montana, and some five miles northeast of the Cut Bank field. It lies in juxtaposition with the Darling Pool to the southwest and strikes approximately 45° northeast an unknown distance into Canada.

HISTORY

The first well to start action in the area in question was the American No. 1 Swenson, located in the C SW SE Section 13, Township 37 North, Range 5 West. This well had an initial production of 300 BOPD and was completed May 11, 1951. There are now 30 producing wells and three testing, six of which are on the Canadian side. There have been 16 dry holes drilled in the area in question, three of which are in Canada.

STRUCTURE

The North Darling Pool lies in an area of a rather simple series of north-south trending, north-plunging antihlinal noses. It trends in a northeast direction across a synclinal nose lying midway between the Hay Lake Nose to the west and the Border Nose to the east.

It is the writer's opinion that structure has little or no relationship to the trapping of oil at the horizon this pool produces.

* Consulting geologist, Emrick Oil Field Management, Inc. The writer expresses his appreciation to Richard A Higgins and Norman H. Warburg, Union Oil Company of California, Cut Bank, Montana, for their constructive criticism and suggestions.

STRATIGRAPHY

It is beyond the scope of this report to go into a detailed stratigraphic study of the area.

Suffice it so say that the producing horizon is the so-called Moulton sand of the Sunburst sand section of the lower Kootenai formation of Lower Cretaceous age.

It is described in the Billings Geological Society Guidebook, 1952, p. 138, as the lenticular upper andesitic member of the Sunburst sand and is equivalent to part of the Lakota of Montana.

The producing zone is from 0 feet to 50 feet thick and is a light gray to gray, fine-grained quartz sandstone with accessory dark chert and some colored grains of probable igneous origin. The quartz grains are usually, but not always, frosted and in most cases have a considerable amount of amber-colored quartz grains.

The sand is very erratic and sometimes changes lithology rather rapidly in a short distance. It also may thin or thicken very rapidly. In one case it thinned from approximately 50 feet to three feet in about 600 feet. A subseas map shows a wide divergence in the top of the sand. This has been as much as 190 feet in a mile and a half, and as much as 31 feet in a 440-foot offset.

The writer is convinced that there are at least two producing sand lenses and probably three. This would account for the wide divergence in tops and the seemingly rapid changes in lithology. Also, where an extra thick section is encountered it is, at least in some cases, caused by the confluence of two or more of these sand stringers.

PRODUCTION REMARKS

It is beyond the scope of this report to come to any definite conclusions or to make any specific recommendations as far as production practices are concerned.

The writer will attempt to tell the production story as he knows it and will let the reader draw his own conclusions.

The writer is of the opinion that the producing area involving the American Swenson lease, the Union Oil Kruger lease, the Winkler Vargo lease, and the Crusade Rhone lease will have little or no bearing on Canadian production. However, some people may disagree with this assumption; therefore, a brief account of some production practices in this area follows:

The American No. 1 Swenson has received considerable criticism because it allowed considerable gas to escape while being flowed through the casing for a period of approximately two months. The operators attempted to flow through tubing, but the well paraffined up. The well had a relatively high gas-oil ratio and would not produce if the gas was shut in. The pipe in this hole was set in the gas zone, hence the high gas-oil ratio. It is the opinion of some competent engineers that to get the oil the well had to be flowed, and that the ultimate natural recovery was not reduced a serious amount.

The producing area is so small that the wells have a very high decline no matter how they are produced.

A significant point here is the fact that Spruce Oil Hintrager gas well, located C NE NW Section 24, Township 37 North, Range 5 West, came in at over 40,000 MCF/day from the Moulton. At the time the American Swenson No. 1 was drilled in, the Hintager well was making little over 2,000 MCF/day. This would tend to make the amount of gas lost from the Swenson well rather insignificant.

The Union Kruger wells are controlled as follows:

No. 1 Kruger is set to pop off when pressure surpasses 40 pounds.

No. 2 and No. 3 Kruger are set to pop off when pressure surpasses 20 pounds.

This is probably not much more gas than would run the lease if it were using gas engines.

The Winkler Vargo wells are set to pop off when pressure surpasses 10 pounds.

The Crusade Rhone lease makes such an insignificant amount of both oil and gas that its operation has little or no effect on the area.

The Pattie & Stewart-Ponder Peck lease and Albermont's and Boyd Stewart's Parker leases situated in Section 4, Township 37 North, Range 4 West are quite probably producing from the same horizon as the Ponder-Rio Prado wells in Section 6, Township 1, Range 16 West 4 on the Canadian side.

The writer does not think that this little pool is connected to the Amercan-Union-Winkler pool, and it is doubtful if it has any direct bearing on the newly opened Fair-Union area in Sections 5-6, Township 37 North, Range 4 West.

The Pattie & Stewart Peck wells, the Albermont Parker well, and the Boyd Stewart Parker well are popping off gas. The Ponder people told the writer they are not popping off the Ponder-Rio Prado wells.

This is a small productive area that will have a small ultimate recovery. Seven of the 12 wells in this immediate area had an *IP of less than fifteen BOPD*, and four of these had an *IP of five or less BOPD*. Two dry holes were drilled on the American side and two on the Canadian side.

The newest development in the North Darling Area is in Sections 5-6, Township 37 North, Range 4 West. Five wells have been drilled in this immediate area — four on the American side and one on the Canadian side. Two were dry holes, one in Canada and one in the United States.

The Fair-Ashland No. 1 Hall-Parker is producing approximately 175 BOPD and is set to pop when the gas pressure surpasses 25 pounds.

The Union State 449 No. 1 had an IP of 70 BOPD and is still being tested. The Fair-Ashland No. 1 Clifford-Parker is still testing.

Most operators in the area use the completion practice of not setting production casing

until a show of oil is encountered. This enables the casing to be set through the gas zone and, therefore, forestalls a high gas-oil ratio and prevents gas wastage.

WELL SPACING

There is 10, 20 and 40 acre spacing in the area in question. The lenticular character of the sand lenses encountered in this area makes it very difficult to set a spacing plan.

Forty acre spacing would have resulted in many more dry holes, and some lease holders who have production from 10 acre spacing very easily could have little or no production from 40 acre spacing.

Twenty acre spacing is adequate in most of the area. However, some lease holders would have little or no production where the sand lenses out just inside their acreage. These operators take the view that oil under any part of their lease belong to them, and they have the right to attempt to recover it.

CONCLUSION

The writer has attempted to give a brief history and a cursory geological and engineering examination of the area known as the North Darling Pool.


It is beyond the scope of this report to come to any definite conclusions or make any recommendations as far as production practices are concerned.

The writer has attempted to outline the available information and let the reader draw his own conclusions.

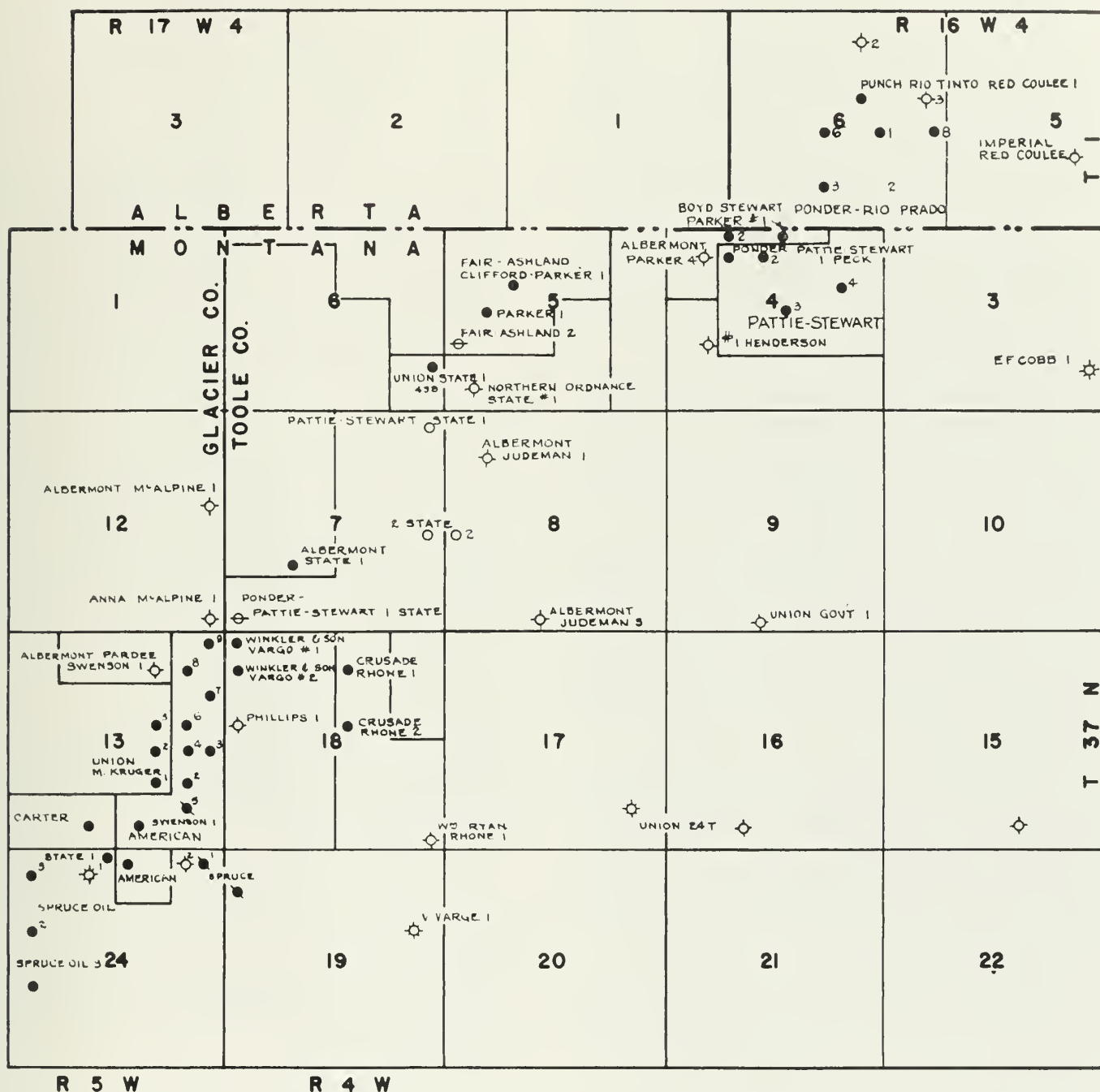
Respectfully submitted,

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LEGEND

- LOCATION
- ⊕ DRILLING
- PRODUCING OIL
- ⊙ PRODUCING GAS
- ◇ ABANDONED
- DRY HOLE

